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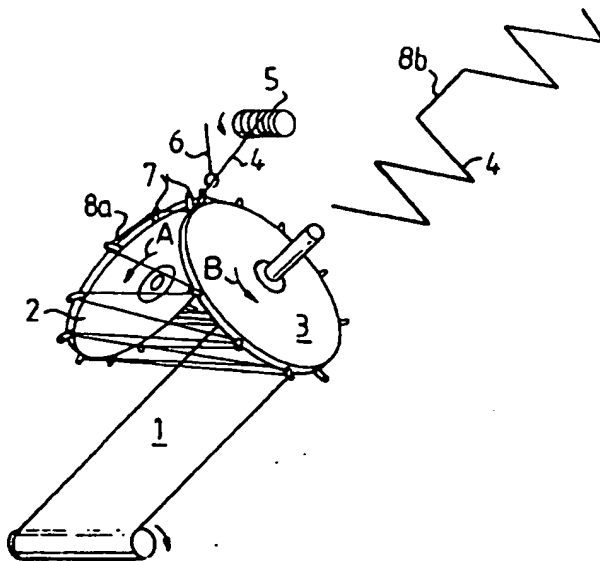
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(54) Title: **METHOD AND DEVICES FOR LAYING A THREAD ON A SUBSTRATE**

(57) Abstract

In a method of applying a thread to a moving substrate, a thread is continuously dispensed to a pick-up point at the point of contact between two rotating wheels (2, 3) inclined towards each other and provided on their peripheries with fingers (7) which hook the thread and move it to one side or the other as they rotate, and then deposit the thread extended between said fingers 180° from the pick-up point. Long spaces between the fingers (7) on one wheel or the other make it possible to lay the thread longitudinally (8b) or in a long diagonal line instead of merely in a lateral zig-zag pattern. The invention also relates to devices for carrying out said method.



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Method and Devices for Laying a Thread on a Substrate

The present invention relates to a method for applying a thread onto a relatively moving substrate in accordance with the preamble to the accompanying Claim 1. The present invention also relates to devices for carrying out said method in
5 accordance with the preambles to Claims 2 and 3.

Such a method and device for applying a thread onto a relatively moving substrate is described in Swedish Patent No. 209 771. It describes how lengths of thread can be laid
10 substantially transversely over longitudinal threads moving thereunder to thereby form a net elastic web. Two wheels inclined towards each other above the substrate of longitudinal threads almost touch at the top. Each of the wheels is provided on its periphery with uniformly spaced fingers
15 which alternately hook a thread dispensed centrally from a spool to said point of contact between the inclined wheels, as the wheels rotate. The alternating hooks thus move away from each other as they are moved with the periphery of their respective wheels, thereby gradually extending the thread,
20 somewhat in the manner of a "cat's cradle", in a zig-zag pattern from one wheel to the other, reaching its broadest extent directly above the substrate and diametrically opposite to the pick-up point of contact between the two wheels. In the method and device shown in this Swedish patent
25 specification, the transversely extended threads, upon reaching their point of greatest extension, are cut by a knife and glued to the longitudinal threads.

By this known method and device however with uniformly spaced
30 fingers and where the threads are cut off in transverse lengths, only a transverse pattern can be created with the thread. In the manufacture of elastic pants products such as pants diapers cut end-to-end from a web, it is necessary to lay elastic threads transversely in the waist area for
35 example, and longitudinally to elasticize the leg openings for example. Up to now this has involved a number of dif-

ferent separate process procedures making the method complex, and thus costly and/or prone to error, and different threads which have to be glued separately, at least at their ends, and this can give rise to a number of loose ends in the product.

All of these problems are solved by the method described by way of introduction which is characterized by the steps disclosed in the characterizing clause of Claim 1. In this way it is possible to apply a single or several parallel elastic threads continuously along a pants diaper web of indefinite length, thus providing both transverse elasticity in the waist portion and sealing elasticity around the leg openings as well as longitudinal elasticity over the crotch portion, as will be evident from the detailed description of the present invention.

One inventive device for carrying out the method according to the invention has the features disclosed in Claim 2. Removing certain of the projecting elements from one or both of the wheels enables the device to lay down the thread continuously with both transverse zig-zag portions and entirely longitudinal and/or inclined longitudinal portions.

A second inventive device for carrying out the method according to the invention has the features disclosed in Claim 3. The projections can be shaped so that certain of them release the thread from engagement, thus creating the same pattern as with the device described above but with a different elasticity in the longitudinal portions.

According to one particularly advantageous embodiment of the invention, the projecting elements or fingers are mounted externally on belts running on the inclined wheels, which in this case are pulleys. While running on the inclined pulleys from the pick-up point to the points diametrically opposite therefrom, the device functions in the same manner as the above device. The belts have the front inclined pulleys there however, keeping the thread in its extended zig-zag/-

longitudinal pattern. The thread can either be pressed by suitable means, a roller for example, off the projections into application against the substrate or the belts can be twisted inwards by virtue of the second pair of pulleys being vertically aligned or oppositely inclined to the first pair of wheels/pulleys, or the two methods can be combined. According to a preferred practical embodiment, two pairs of inclined wheels in spaced longitudinal and transverse relationship transfer the thread, preserving its zig-zag/longitudinal pattern, to a conveyor belt carrying fingers or projections running in two parallel rows.

The method according to the present invention can be used with particular advantage in, but is not limited to, the manufacture of disposable absorbent articles such as diapers, pant diapers, sanitary briefs, incontinence shields etc.

The invention will now be described in more detail below with reference to several examples shown in the accompanying drawings of which:

Fig. 1 shows the principle of the invention with reference to a schematic representation in perspective of an embodiment of the device described in Claim 2;

Fig. 2 shows the thread pattern produced by the embodiment shown in Fig. 1, i.e. with one projecting element removed;

Fig. 3 shows the thread pattern produced by an embodiment (not shown) with two projecting elements left off one wheel;

Fig. 4 shows the pattern produced when a number of different projecting elements are left off each wheel;

Fig. 5 shows the pattern which can be produced by using four parallel pairs of inclined wheels in accordance with the invention, and

Fig. 6 shows the finished cut out diaper with the pattern shown in Fig. 5.

5 Figs. 7A and 7B show a longitudinal view and an end view respectively of a schematic drawing of one practical embodiment of a device according to the invention for carrying out the method according to the invention.

10 Figs. 8A and 8B show a longitudinal view and an end view respectively of a schematic drawing of a second practical preferred embodiment of a device according to the invention for carrying out said method.

15 Fig. 9 shows a longitudinal section through one type of rotating finger cap which can be used.

Fig. 10 shows a pant diaper substrate similar to that shown in Fig. 6 with an elastic net bonded to the substrate.

20 Fig. 11 shows the pant diaper substrate with an elastic in accordance with Fig. 6 with an absorption unit fastened on the pant substrate.

25 Fig. 12 shows the pant substrate with an elastic in accordance with Fig. 6 with an absorption unit of a second embodiment fastened to the pant substrate.

30 As can be seen in Fig. 1, a substrate web 1, which can be the cohesive pants layer of a pants diaper for example, moves beneath two rotating wheels 2, 3. These wheels 2, 3 are inclined towards each other and almost touch each other at their uppermost points. A thread 4, which in this case can be an elastic cotton spun rubber thread or a Lycra^R thread is dispensed from a spool 5 and runs through a thread guide 6 to the point of contact between the two wheels 2, 3. There the thread is hooked to one side or the other by the projecting elements or fingers 7 distributed around the outer periphery of each wheel and which cross each other at the point of contact. To produce a zig-zag pattern the projecting elements

or fingers 7 are arranged evenly spaced on converging portions of the two wheels alternately hooking the thread. As the wheels 2, 3 rotate, as indicated by the arrows A and B in the drawing, the respective fingers, with the thread hooked thereto will diverge, extending the thread between them in a broader and broader zig-zag pattern, until reaching a lowermost point directly above the moving substrate web where means, a roller extending across the width of the substrate for example (not shown in Fig. 1), are arranged to push the thread out of engagement with the fingers 7 after having established adhesive contact with the substrate, thus laying out the thread in a zig-zag pattern. It is also possible to provide the moving substrate with two rows of pins along their lateral margins, to which the thread is transferred in its extended pattern to be subsequently sandwiched between two layers of non-woven fabric for example. Further embodiments are described below in connection with the discussion of Figs. 7A, 7B, 8A, 8B.

Certain selected fingers or series of fingers may be left off one or the other wheel to lay the thread, longitudinally (as shown in Fig. 1, 2 and 3) or obliquely longitudinally as shown in Figs. 4, 5 and 6, in addition to laying the thread in the basic zig-zag pattern. In the example shown in Fig. 1 the thread is hooked and lain in the basic uniform zig-zag pattern with the exception that one finger has been eliminated from the wheel 3, thus producing a longitudinal extension 8a of the thread, which is preserved in the longitudinal portion 8b of the thread in adhesive contact with the substrate 1.

This effect can of course be achieved in other ways; for example by designing certain of the fingers in such a way that they release the previously hooked thread before reaching adhesive contact with the substrate. This can alleviate problems with excessive transverse stretching of the thread.

The thread, which can be elastic, can also be laid between two layers of non-woven material which adhere to each other.

This has several advantages which will become evident from the explanation below.

Fig. 2 shows the pattern of the thread produced by the device as configured in Fig. 1, with one finger being eliminated from one wheel, thus producing one longitudinal section 8b in the otherwise basic zig-zag pattern of the thread 4. Fig. 3 shows the pattern produced when two fingers are eliminated from one wheel. Fig. 4 shows a pattern, which is very useful in the production of diapers and pants diapers as will become evident below. This pattern is produced by first eliminating a pair of fingers 7a, 7b from each wheel, thereby creating a diagonal portion 9a. The eliminated finger 7c produces a longitudinal section 8b, which is followed by a diagonal section 9b, oppositely oriented to the diagonal portion 9a, and which is produced by eliminating a pair of fingers 7d, 7e from each wheel.

Four patterns of this type 10, 11, 12, and 13 are laid out in parallel as shown in Figs. 5 and applied to an elasticized pants type diaper as shown in Fig. 6. To do this four pairs of inclined wheels are necessary. Fig. 6 shows an elasticized pants diaper component in its unassembled state cut out of the substrate web with the four patterns 10, 11, 12, 13. The zig-zag pattern areas at either end are transversely elasticized to provide an elastic waist. The two side columns 10, 13 have the zig-zag areas slanted to provide a concave edge surface to accommodate the protruding belly shape of the typical toddler, as described in Swedish Patent Application 9402867-7. The longitudinal crotch elastics provide leg sealing elastic and elastic pockets for urine and feces respectively and can be used in conjunction with the absorbent products described in SE 9404567-1.

Thus four parallel continuous threads provide lateral elasticity around the waist and longitudinal elasticity around the legs and in the crotch area. Each of the threads need only be severed at its ends thus making handling of the elastic very simple.

A further advantage is that if the threads are sandwiched between two layers of non-woven fabric, then each of the threads only needs to be bonded at its ends by gluing for example. The convoluted zig-zag pattern will hold the rest of each thread in place since the non-woven fabrics are bonded to each other holding the zig-zag pattern in place.

The method according to the invention can also be applied by using a device where the inclined wheels are pulleys and the projecting elements or fingers are fixed externally on belts running between said pulleys and second pulleys which are vertically oriented or even inclined oppositely to the first pair of pulleys. The fingers follow the periphery of the first inclined pulleys, functioning in exactly the same manner as the wheels with peripherally fixed fingers. The belts then leave the inclined pulleys when reaching the bottom directly above the substrate, keeping the thread extended in the desired pattern between the two belts. The threads can either be pressed by suitable means (e.g. a roller) off the fingers on the belts, and for example be sandwiched between two layers of non-woven fabric or the orientation of the second pulleys can be such that the thread slips naturally off the fingers as the belts are twisted.

Figs. 7A and 7B show one practical embodiment of the device according to the invention. A pair of inclined pulleys 15, 16 carry belts 22a, b which run over opposite pulleys 18 to follow a path essentially parallel to the substrate 1. The belts 22a, b are provided with projections or fingers 17 spaced with appropriate longer gaps 23 to achieve the desired zig-zag/longitudinal pattern. The thread 4, which in this case is an elastic thread, runs from a spool (not shown) in the direction of the arrow E along the entire upper run of the belts, where the fingers 17 carried by the belts 22a, b are held in crossed configuration with the thread running between them. Upon reaching the pulleys 15, 16, the belts 22a, b carrying the fingers 17 diverge creating the desired zig-zag/longitudinal pattern which is preserved as the belts leave the pulleys and proceed along the lower run. A roller

19 running between the belts 22a,b along the lower run press-
s the thread in the zig-zag/longitudinal pattern from the
fingers 17 and onto the substrate 1 which has just been
sprayed with glue 21 from a gluing unit 20, thus embedding
5 the thread and preserving the desired zig-zag/longitudinal
pattern.

In order to prevent friction between the thread 4 and the
fingers 17 from causing excessive tension and breakage of the
10 thread as the fingers diverge, each finger 17 is provided
with a rotating cap 24 (See Fig. 9) which rotates freely on a
finger pin 25 via either a journal bearing (not shown) or a
rolling contact bearing 26.

15 Figs. 8a and 8b show in a longitudinal view and an end view
respectively another preferred practical embodiment of the
present invention using finger-equipped intermediate transfer
belts 31a,b,c,d between two pairs of finger-equipped inclined
wheels 27, 28 and 29, 30 and the moving substrate 1. The two
20 pairs of inclined wheels 27, 28 and 29, 30 are spaced both
longitudinally and laterally as can be seen in the drawing to
provide two zig-zag/longitudinal patterns on the substrate
which are almost contiguous side-by-side. Each pair of in-
clined wheels receives between converging fingers a thread
25 fed from one of two spools (not shown) in the direction E_2 ,
whereupon the diverging fingers of the rotating wheels create
the zig-zag/longitudinal pattern in the manner described
above. As the fingers reach the bottom of the rotating
wheel, the thread is transferred, preserving the zig-zag/lon-
30 gitudinal configuration of the thread, onto fingers carried
on belts 31a,b,c,d arranged in parallel relation to each
other. There is one transfer belt 31a,b,c,d for each inclined
wheel 27, 28, 29, 30. The thread after arriving at the sub-
strate is then pressed into glue 21 which has been sprayed
35 onto the substrate, in the same manner as was described above
in conjunction with Figs. 7A and 7B.

This arrangement with intermediate transfer belts prevents
glue from penetrating into the finger cap bearings 26 (see

Fig. 9) and preventing the finger caps 24 from rotating, and thereby giving rise to thread friction and thread breakage.

5 The intermediate transfer belts 31a,b,c,d, in contrast to the embodiment shown in Fig. 8a with longer gaps 32b corresponding to those 32a on the inclined wheels, can be provided a continuous tightly spaced series of fingers covering the entire belt. This eliminates the need for synchronization of the belts to the wheels while still preserving the original
10 zig-zag/longitudinal pattern produced by the inclined wheels 27, 28 and 29, 30. This also enables the pairs of wheels to be changed as needed to produce different patterns, without replacing or synchronizing the intermediate transfer belts 31a,b,c,d. Having a continuous tightly spaced series of fingers
15 on each transfer belt also makes it possible to run belts at slightly different speeds so that one belt will advance during a complete cycle an integral number of fingers in relation to the other belt in each pair of belts. This will enable one to achieve zig-zag patterns which are skewed i.e. do not advance uniformly while moving from one side to the other (see patterns 10 and 13 in Figs. 5 and 6) or are even
20 retrograde from one side to the other.

25 It is also possible to arrange pairs of inclined wheels in direct series in order to superimpose different patterns on top of each other, for example a longitudinal pattern superimposed on a zig-zag pattern to provide both longitudinal and transverse elasticity and/or strength.

30 Fig. 10 shows a pant 10 formed of a pant substrate of a non-woven material and an elastic stretched as the elastic described in connection with Fig. 1-6.

35 Fig. 11 shows an absorption unit 11, comprising of two part 12 and 13 where the first part 12 is arranged to cover the urine opening 14 in the pant 10 and where the second part 13 is arranged to cover the anal opening 15. The absorption part 12, comprising an outer liquid impermeable cover 16, fastened at its periphery against the pant.

The space inside said cover ¹⁰16 may be filled with an absorbent, material, such as cellulosic fluff and/or absorbent gel.

5 The absorption part 13 for feces comprises an outer liquid impermeable cover 17 fastened at its periphery against the pant. The space inside the cover 17 is preferably empty as it intended to keep feces inside the cover.

10 In Fig. 12 the absorption unit 11, covers both the urine opening 14 and the anal opening 15. The absorption unit may comprise absorbent material inside the cover 18.

15 The absorbent articles according to Fig. 11 and 12 can be modified. The important thing is in contrast to known absorbent article that a pant is formed which pant is in close contact with the users skin all over the pant and proximate the user's urethral opening and anus and that the absorption unit is arranged on the outside of the pant and is held up by it.

20 The elastic pant can be designed with small holes 14, 15 because they are held in place and kept open by the elastic properties of the pant.

25 When feces or urine is excreted, they will pass through their respective holes and into their respective pockets in the absorption unit.

30 The urine and feces collecting parts 12, 13 can be fastened to the pant tightly sealed to the portions of the elastic pant immediately surrounding the respective ones of said holes.

35 The front pocket, absorption part, 12 may be filled and weighted down with urine without it pulling the elastic pant out of position in contact with the user. Since the two parts 12 and 15 are separated from each other the feces and urine will not mix, which is advantage us for preventing irritation to the skin.

The cover 16 and 17 can be made of elastic material to be able to expand as they are filled with feces or urine. The covers 17 and 18 can also be folded as a bellows to expand as they are filled.

CLAIMS

1. Method of applying a thread (4) to a moving substrate (1), whereby a thread is dispensed proximate a point of mutual peripheral contact or near contact between the edges, remote from said substrate, of two wheels (2, 3), pulleys or other
5 rotating elements inclined towards each other, projecting elements (7) being arranged peripherally on or in conjunction with each of said two wheels, each of said projecting elements being arranged to engage said thread at or near said point of mutual peripheral contact or near contact and move
10 said thread laterally in respect to the direction of movement of said substrate as each engaging, peripherally arranged projecting element moves with its respective inclined rotating wheel, said thread being deposited in its laterally extended state between projecting elements of the two wheels,
15 characterized in that at least one portion of the periphery of at least one of the wheels has two or more engaging projecting elements with no intervening projecting elements on the portion of the other wheel passing the point of mutual peripheral contact or near contact at the same time as said
20 at least one portion or in that said thread is released from engagement with certain projecting elements, to provide longitudinal or substantially longitudinal application (8b) on the substrate (1) of the thread (4) in addition to substantially transverse application of the thread on the substrate.

25
2. Device for applying a thread (4) to a moving substrate (1), whereby a thread is dispensed proximate a point of mutual peripheral contact or near contact between the edges, remote from said substrate, of two wheels (2, 3), pulleys or
30 other rotating elements inclined towards each other, projecting elements (7) being arranged peripherally on or in conjunction with each of said two wheels, each of said projecting elements being arranged to engage said thread at or near said point of mutual peripheral contact or near contact and
35 move said thread laterally in respect to the direction of movement of said substrate as each engaging, peripherally

arranged projecting element moves with its respective inclined rotating wheel, said thread being deposited on said substrate in its laterally extended state between the projecting elements of the two wheels, characterized in that at least one portion of the periphery of at least one of the wheels has two or more engaging projecting elements with no intervening projecting elements on the portion of the other wheel passing the point of mutual peripheral contact or near contact at the same time as said at least one portion, to provide longitudinal or substantially longitudinal application on the substrate of the thread in addition to substantially transverse application of the thread on the substrate, each wheel being provided with projecting elements or fingers permanently peripherally fixed to each wheel, said projecting elements or fingers being alternately spaced on converging portions of both of said wheels for applying said thread in a transverse zig-zag pattern and non-alternately spaced on portions of said wheels for applying said thread in a substantially longitudinal pattern (8b).

3. Device for applying a thread to a moving substrate, whereby a thread is dispensed proximate a point of mutual peripheral contact or near contact between the edges, remote from said substrate, of two wheels, pulleys or other rotating elements inclined towards each other, projecting elements being arranged peripherally on or in conjunction with each of said two wheels, each of said projecting elements being arranged to engage said thread at or near said point of intersection and move said thread laterally in respect to the direction of movement of said substrate as each engaging, peripherally arranged projecting element moves with its respective inclined rotating wheel, said thread being deposited in its laterally extended state between the projecting elements of the two wheels, said projecting elements or fingers being characterized in that said thread is released from engagement with certain projecting elements to provide longitudinal or substantially longitudinal application on the substrate of the thread in addition to substantially transverse application of the thread on the substrate.

4. Device according to Claim 2 or 3, characterized in that said wheels are first pulleys and that said projecting elements arranged peripherally in conjunction with said first pulleys are fixed externally to an individual belt running
5 between each pulley and a second individual pulley for each belt.

5. Device according to Claim 4, characterized in that the axis of rotation of each of said second pulleys is not parallel to the axis of rotation of its associated first pulley.
10

6. Device according to Claim 2 or 3, characterized by a pressure roller (19) arranged between said wheels (2, 3; 16, 17) or said belts (22) for pushing said thread from said
15 fingers (7; 17) into adhesion with said substrate (1).

7. Device for applying a thread (4) to a moving substrate (1), whereby a thread is dispensed proximate a point of mutual peripheral contact or near contact between the edges,
20 remote from said substrate, of two wheels (2, 3), pulleys or other rotating elements inclined towards each other, projecting elements (7) being arranged peripherally on or in conjunction with each of said two wheels, each of said projecting elements being arranged to engage said thread at or near
25 said point of intersection and move said thread laterally in respect to the direction of movement of said substrate as each engaging, peripherally arranged projecting element moves with its respective inclined rotating wheel, said thread being deposited on said substrate in its laterally extended
30 state, characterized in that an intermediate belt (31a,b,c,d) for each inclined wheel (27, 28, 29, 30) is arranged opposite the point of intersection of said wheels, said intermediate belt (31a,b,c,d) being provided with fingers (34) corresponding to the fingers (7) on its associated inclined wheel (27,
35 28, 29, 30), to receive said thread in its laterally and longitudinally extended state and, in that state, carry said thread around one end pulley (32) carrying said belt (31a,b,c,d), and thereafter deposit said thread, still in its extended state onto the moving substrate (1).

8. Disposable absorbent pant-like product, such as a diaper, pant diaper, disposable sanitary briefs etc., elastified by applying a continuous elastic thread to a web substrate moving in the longitudinal direction of said absorbent product moving unassembled in series comprising waist portions arranged end-to-end with intermediate crotch portions, characterized in that at least two threads laid out along opposite lateral sides of said substrate, form a tight zig-zag pattern of uniform width at said waist portions and substantially longitudinal or slightly inclined portions at said crotch portions.

9. Absorbent article, such as a diaper, an incontinence garment, a pant diaper or a sanitary napkin characterized by a pant (10) formed of an elastified substrate blank with wider waist portion at its ends and narrower crotch portion therebetween, said elastified substrate blank comprising at least one elastic means, arranged on said substrate in accordance with the method described in claim 1 or 2, said elastic means being bounded to said substrate with the waist portions stretched transversely but not substantially longitudinally and with the crotch portion stretched longitudinally but not substantially transversely at said crotch portion, that said pant (10) in use is intended to be in close contact with the user's skin all over the pant and proximate the user's urethral opening and anus, an absorption unit (11) being arranged on the outside of the pant and being held up by the pant.

10. Absorbent article according to claim 9, characterized in that the absorption unit (11) is substantially smaller than the pant (10).

11. Absorbent article according to claim 9 or 10, characterized in that the pant (10) is provided with a urine opening (14) just in front of urethra and a faeces opening (15) just in front of the anal opening and that the absorption unit (11) is arranged on the outside of the pant (10) for collecting urine and faeces.

12. Absorbent article according to any of claims 1-11,
characterized by that the absorption unit (11) comprises two
separate parts (12, 13) one for urine and one for feaces,
which parts are fastened to the pant (10) enclosing the
5 respective opening (14, 15) in the pant.

13. Absorbent article according to any of claims 9-12,
characterized by that the absorption unit (11) comprises
absorbent materials, such as cellulosic fluff, foam, high
10 absorbing gels or a combination of said material.

14. Absorbent article according to any of claim 9-13,
characterized in that the absorption unit (11) consist of bag
like means arranged outside the openings (14, 15) of the pant
15 for rceiving urine and feaces.

15. Absorbent article according to any of claims 9-14,
characterized in that the absorption unit (11) is expandable
in pace with the outflow of urine and feaces.

20 16. Absorbent article according to any of claims 9-15,
characterized in that the pant (10) has fastening means which
are openable and reclosable, that the pant in open extended
state is hour-glass formed with a narrower crotch portion and
25 wider waist portions and that parts of the fastening means
are arranged in each of the border of the waist parts.

17. Absorbent article according to any of claims 9-16,
characterized in that the pant (10) comprises one or several
30 substrate, preferably of non-woven, on which at least one
elastic means is arranged in extended state to form the
elastic of the pant.

AMENDED CLAIMS

[received by the International Bureau on 01 July 1996 (01.07.96) ;
original claim 7 amended; original claim 8 cancelled;
claims 9-17 renumbered as claims 8-16; remaining claims unchanged (5 pages)]

1. Method of applying a thread (4) to a moving substrate (1),
whereby a thread is dispensed proximate a point of mutual
peripheral contact or near contact between the edges, remote
from said substrate, of two wheels (2, 3), pulleys or other
5 rotating elements inclined towards each other, projecting
elements (7) being arranged peripherally on or in conjunction
with each of said two wheels, each of said projecting ele-
ments being arranged to engage said thread at or near said
point of mutual peripheral contact or near contact and move
10 said thread laterally in respect to the direction of movement
of said substrate as each engaging, peripherally arranged
projecting element moves with its respective inclined rota-
ting wheel, said thread being deposited in its laterally
extended state between projecting elements of the two wheels,
15 characterized in that at least one portion of the periphery
of at least one of the wheels has two or more engaging pro-
jecting elements with no intervening projecting elements on
the portion of the other wheel passing the point of mutual
peripheral contact or near contact at the same time as said
20 at least one portion or in that said thread is released from
engagement with certain projecting elements, to provide longi-
tudinal or substantially longitudinal application (8b) on the
substrate (1) of the thread (4) in addition to substantially
transverse application of the thread on the substrate.

2. Device for applying a thread (4) to a moving substrate
(1), whereby a thread is dispensed proximate a point of
mutual peripheral contact or near contact between the edges,
remote from said substrate, of two wheels (2, 3), pulleys or
30 other rotating elements inclined towards each other, project-
ing elements (7) being arranged peripherally on or in con-
junction with each of said two wheels, each of said project-
ing elements being arranged to engage said thread at or near
said point of mutual peripheral contact or near contact and
35 move said thread laterally in respect to the direction of
movement of said substrate as each engaging, peripherally

arranged projecting element moves with its respective inclined rotating wheel, said thread being deposited on said substrate in its laterally extended state between the projecting elements of the two wheels, characterized in that at least one portion of the periphery of at least one of the wheels has two or more engaging projecting elements with no intervening projecting elements on the portion of the other wheel passing the point of mutual peripheral contact or near contact at the same time as said at least one portion, to provide longitudinal or substantially longitudinal application on the substrate of the thread in addition to substantially transverse application of the thread on the substrate, each wheel being provided with projecting elements or fingers permanently peripherally fixed to each wheel, said projecting elements or fingers being alternately spaced on converging portions of both of said wheels for applying said thread in a transverse zig-zag pattern and non-alternately spaced on portions of said wheels for applying said thread in a substantially longitudinal pattern (8b).

3. Device for applying a thread to a moving substrate, whereby a thread is dispensed proximate a point of mutual peripheral contact or near contact between the edges, remote from said substrate, of two wheels, pulleys or other rotating elements inclined towards each other, projecting elements being arranged peripherally on or in conjunction with each of said two wheels, each of said projecting elements being arranged to engage said thread at or near said point of intersection and move said thread laterally in respect to the direction of movement of said substrate as each engaging, peripherally arranged projecting element moves with its respective inclined rotating wheel, said thread being deposited in its laterally extended state between the projecting elements of the two wheels, said projecting elements or fingers being characterized in that said thread is released from engagement with certain projecting elements to provide longitudinal or substantially longitudinal application on the substrate of the thread in addition to substantially transverse application of the thread on the substrate.

4. Device according to Claim 2 or 3, characterized in that said wheels are first pulleys and that said projecting elements arranged peripherally in conjunction with said first pulleys are fixed externally to an individual belt running
5 between each pulley and a second individual pulley for each belt.

5. Device according to Claim 4, characterized in that the axis of rotation of each of said second pulleys is not parallel to the axis of rotation of its associated first pulley.
10

6. Device according to Claim 2 or 3, characterized by a pressure roller (19) arranged between said wheels (2, 3; 16, 17) or said belts (22) for pushing said thread from said
15 fingers (7; 17) into adhesion with said substrate (1).

7. Device according to Claim 2, characterized in that an intermediate belt (31a,b,c,d) for each inclined wheel (27, 28, 29, 30) is arranged opposite the point of intersection of
20 said wheels, said intermediate belt (31a,b,c,d) being provided with fingers (34) corresponding to the fingers (7) on its associated inclined wheel (27, 28, 29, 30), to receive said thread in its laterally and longitudinally extended state and, in that state, carry said thread around one end pulley
25 (32) carrying said belt (31a,b,c,d), and thereafter deposit said thread, still in its extended state onto the moving substrate (1).

8. Absorbent article, such as a diaper, an incontinence garment, a pant diaper or a sanitary napkin characterized by a
30 pant (10) formed of an elastified substrate blank with wider waist portion at its ends and narrower crotch portion therebetween, said elastified substrate blank comprising at least one elastic means, arranged on said substrate in accordance
35 with the method described in claim 1 or 2, said elastic means being bounded to said substrate with the waist portions stretched transversely but not substantially longitudinally and with the crotch portion stretched longitudinally but not substantially transversely at said crotch portion, that said

pant (10) in use is intended to be in close contact with the user's skin all over the pant and proximate the user's urethral opening and anus, an absorption unit (11) being arranged on the outside of the pant and being held up by the pant.

5

9. Absorbent article according to claim 8, characterized in that the absorption unit (11) is substantially smaller than the pant (10).

10

10. Absorbent article according to claim 8 or 9, characterized in that the pant (10) is provided with a urine opening (14) just in front of urethra and a faeces opening (15) just in front of the anal opening and that the absorption unit (11) is arranged on the outside of the pant (10)

15

for collecting urine and faeces.

20

11. Absorbent article according to any of claims 1-10, characterized by that the absorption unit (11) comprises two separate parts (12, 13) one for urine and one for faeces, which parts are fastened to the pant (10) enclosing the respective opening (14, 15) in the pant.

25

12. Absorbent article according to any of claims 8-11, characterized by that the absorption unit (11) comprises absorbent materials, such as cellulosic fluff, foam, high absorbing gels or a combination of said material.

30

13. Absorbent article according to any of claim 8-12, characterized in that the absorption unit (11) consist of bag like means arranged outside the openings (14, 15) of the pant for receiving urine and faeces.

35

14. Absorbent article according to any of claims 8-13, characterized in that the absorption unit (11) is expandable in pace with the outflow of urine and faeces.

15. Absorbent article according to any of claims 8-14, characterized in that the pant (10) has fastening means which are openable and reclosable, that the pant in open extended

state is hour-glass formed with a narrower crotch portion and wider waist portions and that parts of the fastening means are arranged in each of the border of the waist parts.

- 5 16. Absorbent article according to any of claims 8-15, characterized in that the pant (10) comprises one or several substrate, preferably of non-woven, on which at least one elastic means is arranged in extended state to form the elastic of the pant.

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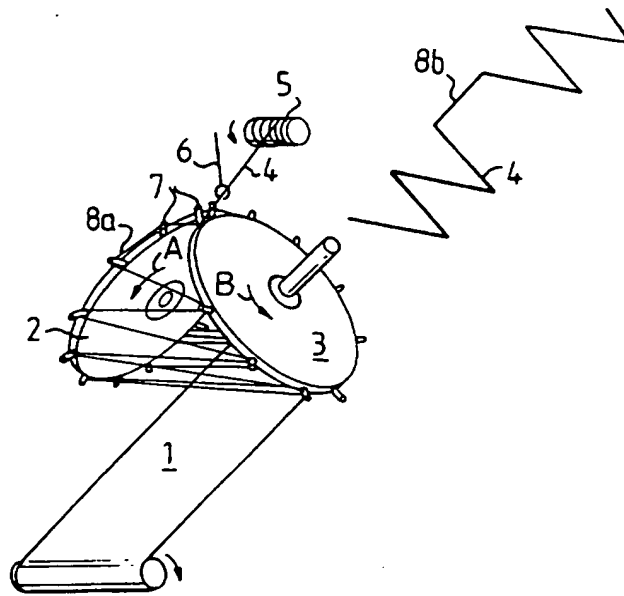


FIG.1

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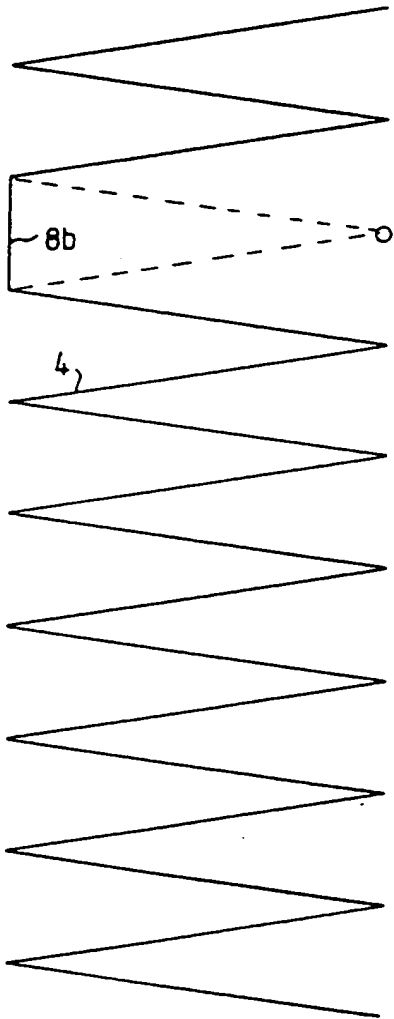


FIG. 2

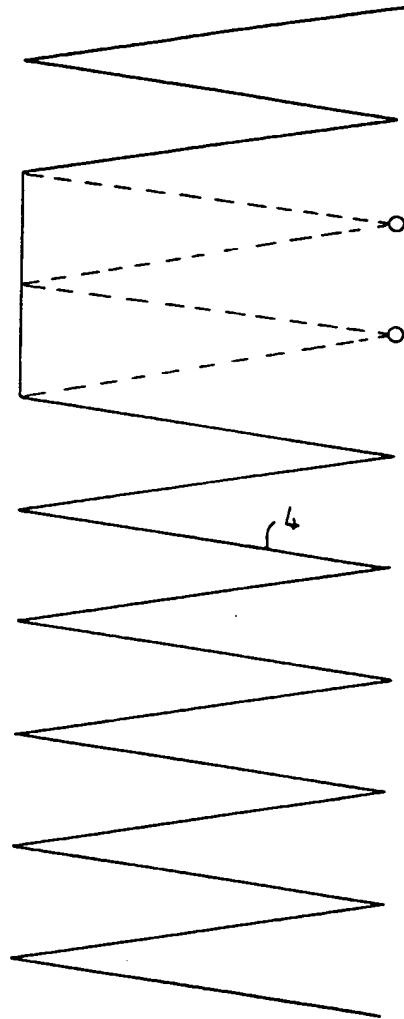


FIG. 3

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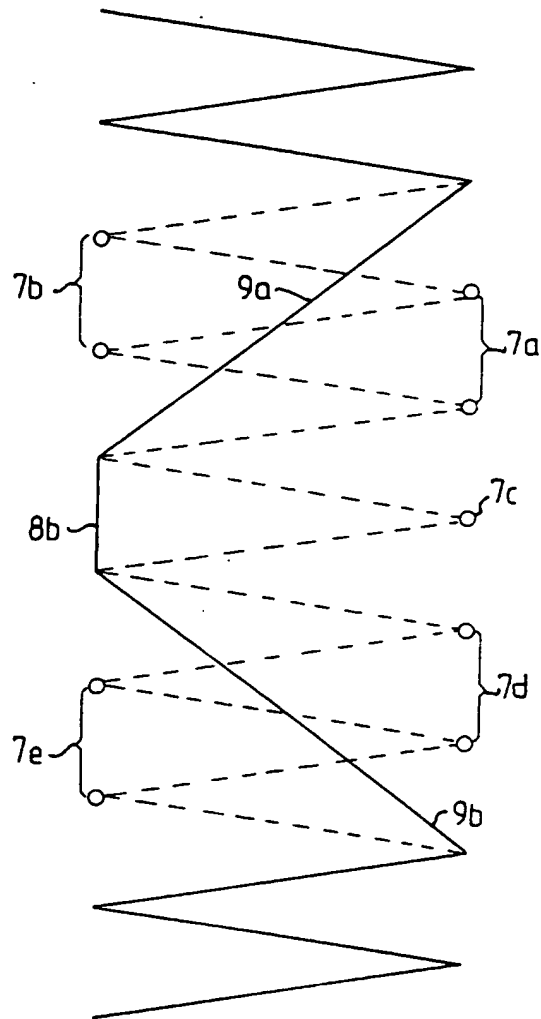


FIG. 4

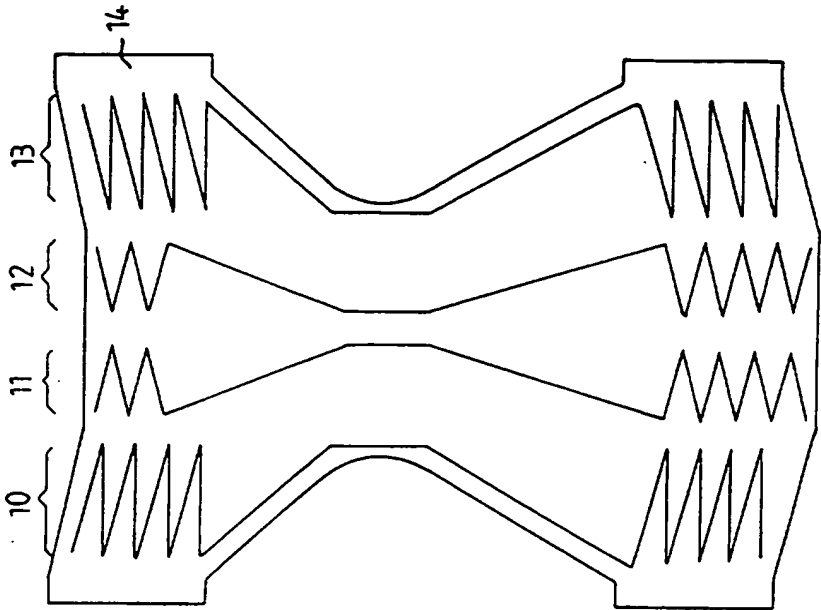


FIG. 6

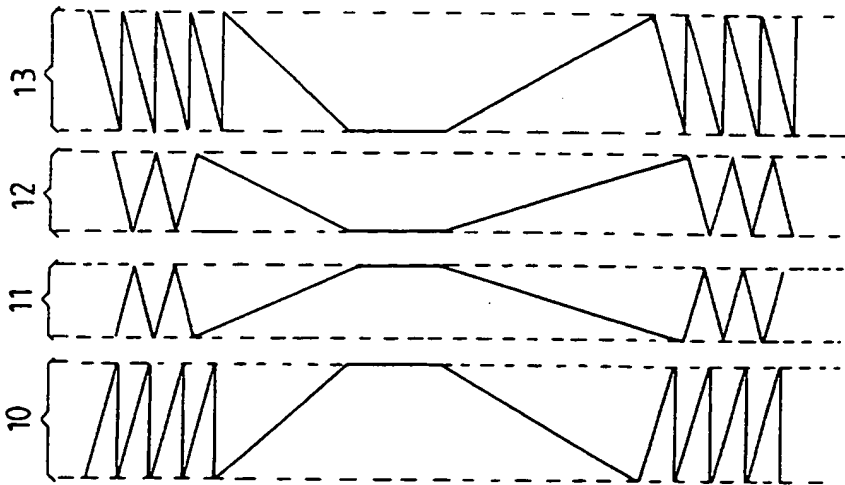


FIG. 5

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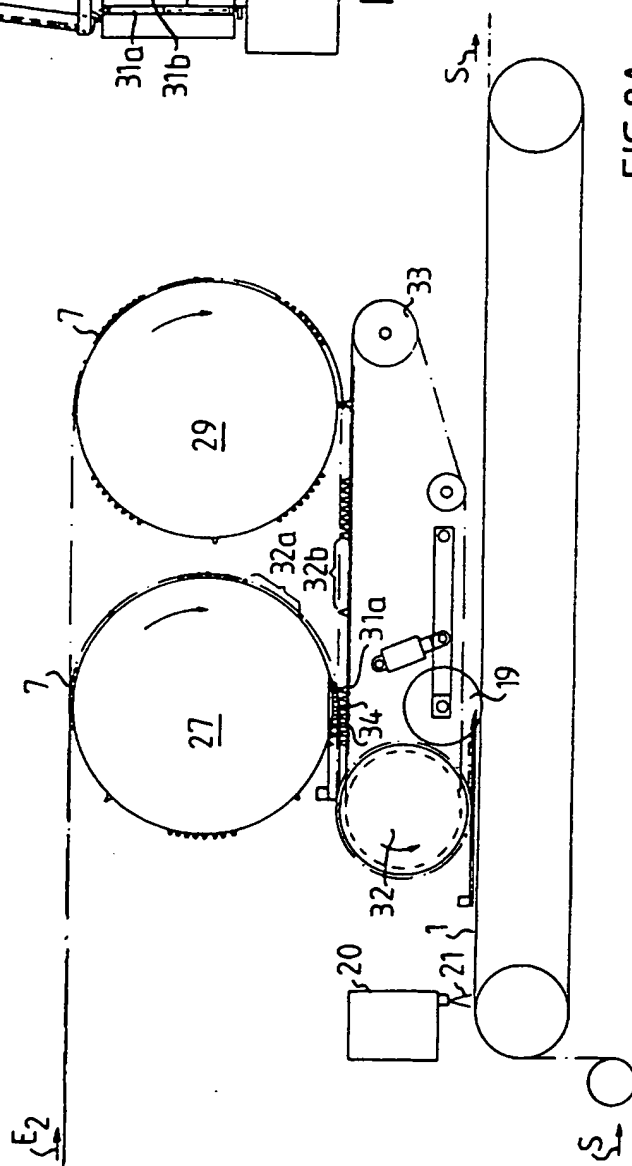


FIG. 8A

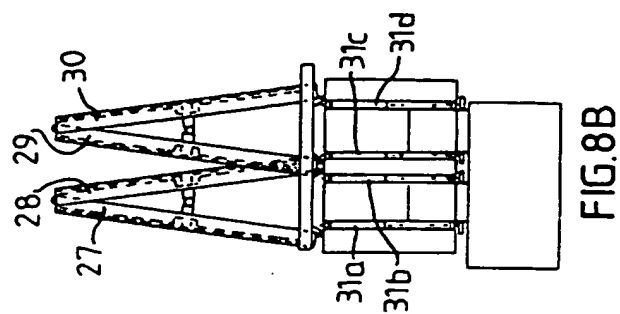
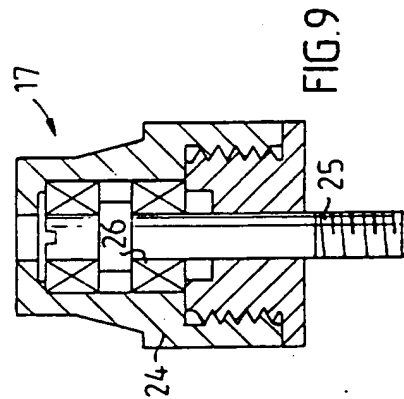
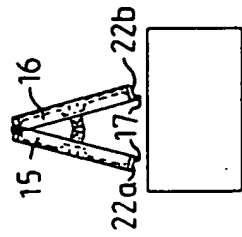
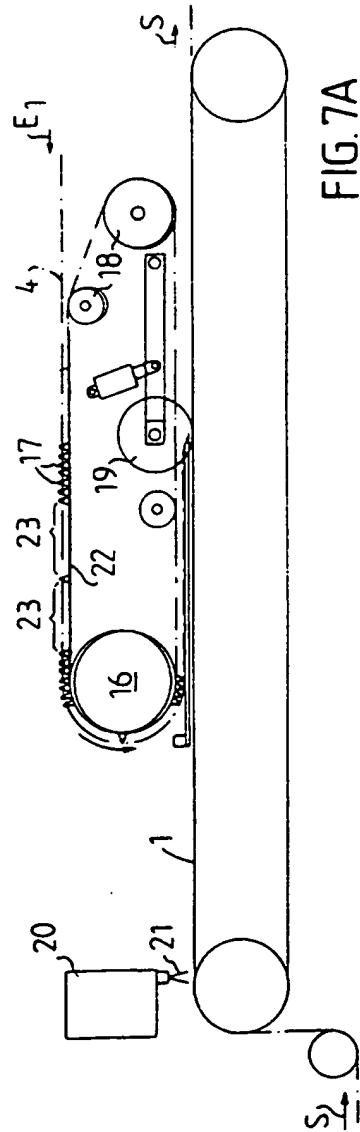


FIG. 8B

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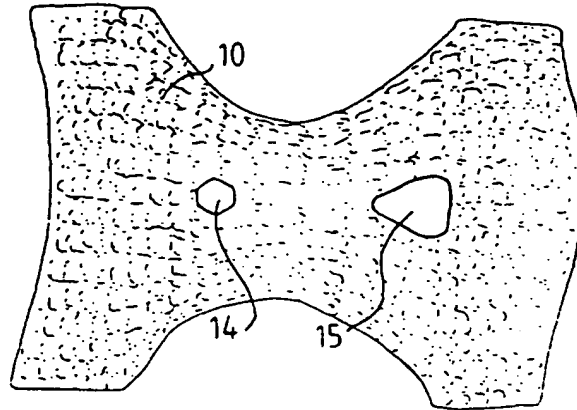


FIG. 10

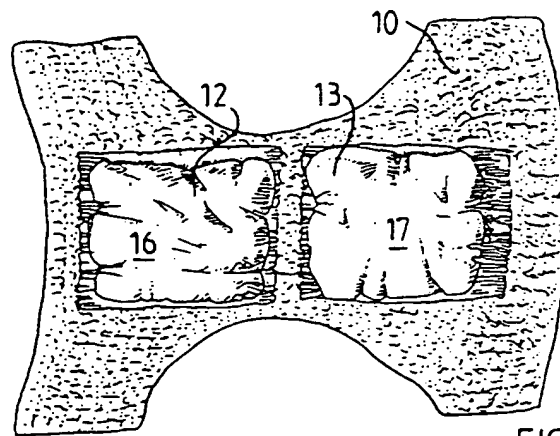


FIG. 11

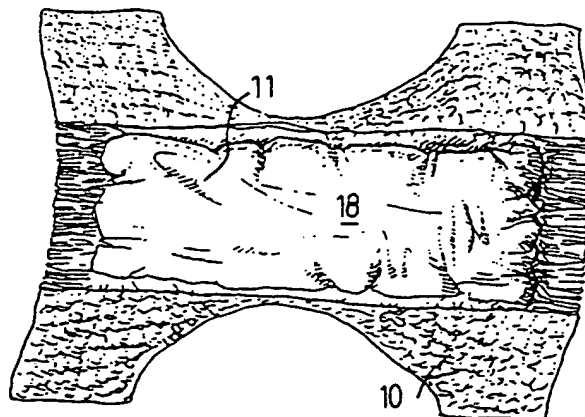


FIG. 12

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 96/00116

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: A61F 13/15, B65H 57/28

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: A61F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	SE 209771 B (G ANDERSSON), 20 December 1966 (20.12.66), page 3, column 1, line 58 - column 2, line 4, claim 1 -----	1-17

☐ Further documents are listed in the continuation of Box C.
 ☒ See patent family annex.

* Special categories of cited documents

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

4 June 1996

Date of mailing of the international search report

05.06.96

Name and mailing address of the ISA/

Swedish Patent Office

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 96/00116

Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. Claims 1-7, 9-17 are related to a method that use two wheels for applying a thread to a moving substrate, a device and an article according to the method.
 2. Claims 8 is related to a disposable absorbent pantlike product, elastified by applying two threads along opposite lateral sides of a moving substrate in a special pattern.
1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
 2. ☒ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
 3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
 4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

01/04/96

International application No.

PCT/SE 96/00116

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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SE-B-	209771	20/12/66	NONE
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